IMPROVED POT AND PAN WASHING MACHINE

Field of the Invention

The present invention relates to improvements in a pot and pan washing machine. More specifically the present invention relates to improvements within the wash tank portion of a pot and pan washing machine, including an improved pump, improved intake manifold and improved jet nozzles for the wash tank. Additionally, the present invention relates to an improved joint and method for connecting two separate portions of a pot and pan washing machine into a single unit.

Background of the Invention

Pot and pan washing machines, of the type used in restaurants, institutions and other eating facilities often involve a large wash tank or basin in which water is circulated about the pots and pans to provide a washing action. One such machine is described in U.S. Patent No. 4,773,436 issued to Cantrell et al., the specification of which is incorporated herein by reference. The machine of Cantrell includes a wash tank with jets located at an elevated position along the rear wall of the wash tank. The tank is filled with water to a level above the position of the jets. Pots and pans are placed in the wash tank, and a pump is activated to draw water from within the wash tank and direct it through the jets to create a jet stream. Each jet directs its jet stream toward the bottom wall of the wash tank, the bottom wall then deflects the jet stream upward and towards the front wall of the tank. The front wall then deflects the upward moving jet stream towards the rear wall of the tank, and the rear wall deflects the jet stream downward and back towards the front

wall along the bottom wall. The combination of deflections of the jet stream from the bottom, front and rear walls provides a rolling washing action within the wash tank.

The basic components of the wash tank of the pot and pan washing machine of the prior art are shown in Fig. 1. Wash tank **10** includes side walls **12** and **14**, rear wall **16**, front wall **18** and bottom wall **19**. A pump can be attached to either side wall; in the embodiment shown in Fig. 1, pump **50** is attached to right sidewall **14**. An impeller located within pump **50** is driven by electric motor **56**. The impeller draws fluid into pump inlet **52** through an intake port (not shown) located in sidewall **14**. The fluid is then discharged from the pump through pump outlet **54** and into outlet manifold **60**. Outlet manifold **60** includes a ninety degree turn, and several other turns, to direct the fluid across the back side of rear wall **16** and out jet nozzles **20** which are protruding through and extending from rear wall **16**. The intake port associated with pump inlet **52** is covered by perforated intake manifold **30**. Intake manifold **30** includes handle **36** and is removably supported within wash tank **10** for easy cleaning. Intake manifold **30** fits tightly between outer runner **32** and inner runner **34**, each of which extends vertically from bottom wall **19**. Heating element **40** is positioned between intake manifold **30** and sidewall **14** for its protection and to maximize the use of space.

Although the prior art pot and pan washing machine disclosed in U.S. Patent No. 4,773,436 provides an exceptional wash action, many of the components discussed above hinder the overall efficiency and performance of the machine. Several of the components of the prior

art machine that hinder performance and efficiency are the pump, the intake manifold and the jet nozzles.

As discussed above, the pump of the prior art draws fluid in through pump inlet **52** in a first direction and then discharges the fluid in a direction perpendicular to the inlet direction. The path of the fluid being discharged from pump **50** must be diverted ninety degrees in a first direction, then upward and sideways across rear wall **16** to reach jet nozzles **20**. Diverting the water path requires a great deal of energy, which significantly reduces the efficiency of the pump. Furthermore, a substantial amount of additional outlet manifold construction is necessary to effect the diversion of the fluid path. This additional manifold construction increases the overall cost of producing the pot and pan washing machine. Thus it is desirable to provide an improved pump for a pot and pan washing machine that streamlines the fluid path of the machine.

Another disadvantage of the pump of the prior art is that motor **56** mounts orthogonal to sidewall **14**. This increases the overall footprint of the machine from side to side. As most pot and pan washing machines are of substantial length due to the use of multiple sink basins, it is of great importance to reduce the overall footprint as much as possible to maximize the use of space in a kitchen. If a pump could be designed to orient the pump motor parallel to the side of the wash tank, the side to side footprint of the machine could be reduced, thereby maximizing usable space within the kitchen.

Additionally, in the event that motor **50** requires servicing, it must be removed axially from the pump. This requires a substantial amount of space to the side of the machine to facilitate

the motor removal. Unfortunately, most kitchens have a limited amount of space, and the already large footprint of the pot and pan washing machine significantly restricts the amount of unused space allotted to the side of the machine. Therefore, it is desirable to provide a pump for a pot and pan washing machine which can be removed in a direction parallel to the side wall of the machine, rather than perpendicular thereto. Additionally, it is desirable to provide such a pump, without the need for an intricate manifold arrangement.

Another component of the pot and pan machine that reduces the overall efficiency and performance of the machine is the intake manifold. Intake manifold **30** is designed to be positioned along the side of the wash tank, reducing the usable wash area within the wash tank. Also, because water is being pulled toward the side of the wash tank, pots and pans within the wash tank will tend to migrate toward the intake side. This pot migration is undesirable because it reduces the effect of the wash action of the machine as pots and pans are clumped together along one side.

Furthermore, the prior art intake manifold is not scalable. This is because, generally, the size of the wash tank is increased by increasing the length from side to side of the tank without changing the front to back width which makes up the width of intake manifold **30**. As the size of the wash tank increases, so does the required flow rate of the pump. This results in an increased draw through the intake, thereby increasing the effects of pot migration and increasing the amount of debris collected by the intake manifold. Therefore, it is desirable to provide a scalable intake

manifold that reduces the effect of pot migration and that does not result in increased manifold vacuum when the length of the wash tank is increased.

Another drawback of the prior art manifold is related to the purpose of the manifold, which is to prevent debris in the wash tank from reaching the pump. Much of this debris will be drawn towards and collected by the intake vacuum. Thus, intake manifold **30** is removable to allow for routine cleaning of the debris from the manifold. If the manifold is not routinely cleaned, the efficiency and performance of the pot and pan washing machine will be significantly inhibited. Therefore, it is desirable to provide an intake manifold that is essentially self cleaning.

One final component of the prior art machine is the jet nozzle. Jet nozzle **20** protrudes from rear wall **16** of the pot and pan washing machine. Thus, the effectiveness of the jet stream on objects near the rear wall of the machine is greatly reduced since the jet stream directly exiting the nozzle initiates in a position away from the rear wall. Objects near the rear wall will only be impacted by the jet stream after it has been deflected back to the rear wall from the front wall. Therefore, it is desirable to provide a jet nozzle design that will permit the jet stream exiting the nozzle to more immediately impact objects located near the rear wall of the washing machine.

In addition to the wash tank, the pot and pan washing machines systems of the prior art usually include additional sink basins or work surfaces for 1) scraping and scrapping, 2) rinsing and 3) sanitizing. All basins or work areas of a washing machine system are preferably positioned along side of each other in their order of use for more efficient operation of the washing machine (the preferred order of use is scrapping/scrapping, washing, rinsing, sanitizing). Additionally,

it is often more efficient, and provides a more aesthetically pleasing appearance, to construct the entire pot and pan washing machine as a single unit at the factory. Unfortunately, such is often impossible due to installation and transportation limitations.

Very few kitchens have entrances large enough to make installation of a four basin washing machine system as a single unit practical. Therefore most pot and pan washing machines are constructed as a two-part (or more as necessary) unit which is assembled onsite during installation. As the pot and pan washing machine is preferably constructed of stainless steel, the preferred method for joining two sections of the machine into a single unit is to weld the sections together. While welding is a rather routine method of construction at the factory, it is not very practical for onsite assembly and installation. This is due to the difficulty of transporting and operating proper welding and grinding equipment onsite to make a smooth weld. Therefore, seems that are welded onsite generally tend to have a less than desirable appearance.

An alternative to welding two sections of a washing machine system together is to bolt the two sections together. Most often a bolted connection is as unattractive as, or even more unattractive than, a poorly welded seem. Additionally, because a bolted connection results in a slight gap between the two sections of the washing machine system in which debris may collect, NSF standards require the inclusion of a two inch gap between the sections to facilitate cleaning. This results in a even greater reduction in the aesthetic appearance of the washing machine system and increases the size of the footprint of the system, or else reduces the usable volume of the basins. Therefore it is desirable to develop an attractive, non-welded field joint for assembling

multiple components of a washing machine system into a single unit having no gaps between the joined components.

Summary of the Invention

A principal object of the present invention is to provide a cost efficient pot and pan washing machine having exceptional efficiency and performance characteristics. Another object of the present invention is to increase the efficiency and performance of a pot and pan washing machine through the use of an inventive pump. Yet another object of the present invention is to increase the efficiency and performance of the pot and pan washing machine through the use of an inventive intake manifold. Another object of the instant invention is to further increase the efficiency and performance of the pot and pan washing machine through the use of an inventive jet nozzle. A further object of the instant invention is to increase the efficiency of installation of the pot and pan washing machine through the use of an inventive field joint.

According to the above described objects of the instant invention, a pot and pan washing machine is provided including:

a wash tank including a bottom wall, a rear wall, a front wall and two side walls extending upwardly from said bottom wall;

an intake port in one of said side walls, said intake port being adjacent to said bottom and rear walls;

an outlet manifold on said rear wall;

a self-draining parallel flow pump including:

a pump inlet associated with said intake port, said pump inlet having an intake path in a first direction, and

a pump outlet associated with said outlet manifold, said pump outlet having an outlet path in a second direction, said second direction being substantially parallel to said first direction;

at least one jet nozzle in association with said outlet manifold to expel at a predetermined angle a jet stream of fluid from said outlet manifold, said jet nozzle including:

a directing tube flush connected to said rear wall and extending into said outlet manifold; and

a perforated intake manifold within said wash tank positioned within a portion of the jet stream of said jet nozzle and positioned to cover said intake port, said intake manifold including an upper portion extending in away from said rear wall towards said front wall at a predetermined downward angle towards said bottom wall, and said predetermined downward angle of said upper portion of said intake manifold corresponds to the predetermined angle of the jet stream of said nozzle.

The inventive pump features a generally helical housing, having an inlet direction generally parallel to the outlet or discharge direction. The parallel flow of the pump increases the efficiency of the pump and thus the pot and pan washing machine by streamlining the fluid path to reduce the amount of diversion of the fluid path required within the machine. In addition to increasing

efficiency of operation of the machine, the use of a parallel flow pump increases the cost efficiency of producing the pot and pan washing machine by significantly reducing the amount of additional manifold tubing required to divert the fluid path.

The generally helical design of the pump housing of the instant invention permits the pump motor to be mounted parallel to the side of the pot and pan washing machine. By mounting the pump motor in this manner, the side to side footprint of the pot and pan washing machine is significantly reduced. Additionally, the orientation of the motor relative to the housing permits easy removal of the pump motor from the pump housing, even in confined spaces, because the pump motor is removed in a direction parallel to the side of the pot and pan washing machine.

Another object of the instant invention is to provide an improved pump that increases sanitation and improves pump life. In accordance with this objective, the pump of the instant invention is self-draining. The generally helical housing of the inventive pump includes a raise volute and a lower intake chamber. An intake port, or pump inlet, is located in the chamber, and an outlet port, or pump outlet, is located in the volute. A portion of the pump inlet comprises the lower most position of the pump housing, permitting fluid to flow, by gravity, from the chamber through the pump inlet and into the wash tank. A drainage passage extends from the lower most portion of the raised volute to the lower chamber, allowing for complete drainage of the volute into the chamber and thereby into the wash tank.

The intake manifold of the instant invention is positioned along the length of the rear wall of the washing machine. This position provides several unique advantages to that of the prior art.

Firstly, the intake manifold is positioned in relatively dead space along the bottom of the rear wall of the wash tank, rather than in usable wash space along the side wall of the wash tank. This space is considered "dead" space because it is the last space impacted by the deflected jet stream. Furthermore, since the side to side length of the wash tank is usually greater than the front to back width, the intake manifold of the instant invention can provide the same intake area as the prior art manifold while having a lower profile. Additionally, the inventive intake manifold can be contoured to assist in the rolling wash action of the pot and pan washing machine by gradually deflecting the path of the jet stream downward and forward. In the prior art pot and pan washing machine, the seem between the rear wall and the bottom wall is filleted or rolled to assist in the rolling wash action of the machine. The intake manifold of the instant invention can be used to perform this function.

Positioning the intake manifold along the rear wall of the washing machine allows the manifold to be scalable to any size machine. This is because the size of the machine is usually increased or decreased through the addition or removal of jets along the length of the rear wall of the machine and the increase or decrease of the rear wall length. The width from front to back of the machine is usually unaltered regardless of machine size. Thus, as the length of the machine increases, so does the length of the intake manifold and the proportional intake area. As higher volume motors are used with the larger wash tanks, the intake vacuum will remain unchanged due to the increased intake area.

Another advantage of the position of the intake of the instant invention is that the intake area can be significantly increased from the intake area of the prior art machine. This reduces the suction or vacuum levels, resulting in more efficient cleaning of pots and pans and elimination of pot migration. The reduced suction will also reduce the amount of debris that collects on the intake manifold, virtually eliminating the need to routinely remove and clean the manifold as required by the design of the prior art. Any minor pot migration that might exist will be toward the rear wall, eliminating the clumping effect associated with the prior art. Additionally, pot migration toward the rear wall will be counterbalanced with the force of the jet stream and the rolling wash action, resulting in a more efficient wash action.

The intake manifold of the instant invention is positioned within a portion of the jet stream emanating from the jet nozzle. This effectively blows off any debris that may collect on the intake manifold, making the manifold virtually self-cleaning. The use of flush mounted jet nozzles assists in this cleaning action by positioning the full force of the initial, non-deflected jet stream closer to the rear wall of the machine than that provided by the prior art. The angle of the intake manifold roughly corresponds to the angle of the jet stream emanating from the jet nozzle to prevent substantial deflection of the jet stream by the intake manifold before the jet stream reaches the bottom wall of the wash tank.

An inventive field joint and method is provided for assembling multiple portions or segments of the pot and pan washing machine into a single unit without the use of either a welded or a bolted connection. This inventive field joint increases the usable basin volume within a given

footprint by eliminating the NSF required gap. The inventive field joint includes a hemmed edge located along an edge of a generally flat side of a first sink basin, and a lip located along an edge of a generally flat side of a second sink basin. A jog extends inward from one of the generally flat sides of the first or second sink basins such that the edge of the associated sink basin extends inward of the generally flat side of that sink basin. The lip is positioned over the hemmed edge forcing the generally flat sides of the first and second sink basins into tight engagement with one another. The inwardly extending jog assures tight engagement of the generally flat sides of the sink basins without any gap therebetween; thus providing an attractive, non-welded seem. The outer sides of the sink basins that have been joined together can be covered with a decorative trim piece to enhance the aesthetically pleasing appearance of the washing machine.

The foregoing and other objects are intended to be illustrative of the invention and are not meant in a limiting sense. Many possible embodiments of the invention may be made and will be readily evident upon a study of the following specification and accompanying drawings comprising a part thereof. Various features and subcombinations of invention may be employed without reference to other features and subcombinations. Other objects and advantages of this invention will become apparent from the following description taken in connection with the accompanying drawings, wherein is set forth by way of illustration and example, an embodiment of this invention.